PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

pplicant's or agent's file reference 03541 DJJ	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
ıternational application No. CT/NZ2004/000074	International filing date *(day/month/year)* 19 April 2004	Priority date *(day/month/year)* 28 April 2003
ıternational Patent Classification (IPC) or national classification and IPC nt. Cl. [7] A23N 12/02, B08B 3/04, B65G 49/04		
pplicant FRESH APPEAL LIMITED et al		

. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

. This REPORT consists of a total of 5 sheets, including this cover sheet.

. This report is also accompanied by ANNEXES, comprising:

a. [X] *(sent to the applicant and to the International Bureau)* a total of 9 sheets, as follows:

- [ ] sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- [ ] sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. [ ] *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

1. This report contains indications relating to the following items:

[X]	Box No. I	Basis of the report
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[X]	Box No. IV	Lack of unity of invention
[X]	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
[ ]	Box No. VI	Certain documents cited
[ ]	Box No. VII	Certain defects in the international application
[ ]	Box No. VIII	Certain observations on the international application

Date of submission of the demand 26 November 2004	Date of completion of the report 8 August 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **COLIN FITZGIBBON** Telephone No. (02) 6283 2226

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NZ2004/000074

ox No. I Basis of the report

With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1 (b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☐ the international application as originally filed/furnished

☒ the description:

pages as originally filed/furnished

pages* **1 to 5** received by this Authority on **19 January 2005** with the letter of **19 January 2005**

pages* received by this Authority on with the letter of

☒ the claims:

pages as originally filed/furnished

pages* as amended (together with any statement) under Article 19

pages* **6 and 7** received by this Authority on **19 January 2005** with the letter of **19 January 2005**

pages* received by this Authority on with the letter of

☒ the drawings:

pages as originally filed/furnished

pages* **1 /2 and 2/2** received by this Authority on **19 January 2005** with the letter of **19 January**

:005

pages* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NZ2004/000074

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has:

   ☐ restricted the claims.

   ☐ paid additional fees.

   ☐ paid additional fees under protest.

   ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

   ☐ complied with.

   ☒ not complied with for the following reasons:

   The International Preliminary Report on Patentability (Chapter II) has been drawn up in respect of the entire international application but the International Preliminary Examining Authority is of the opinion that the application does not appear to comply with the requirements of unity of invention as set forth in the PCT regulations (Article 34(3); Rule 68(1) PCT).

   The separate groups of invention are:

   1. Claims 1 to 7, 10, 13, 14 and 18 are directed to an apparatus for immersing material or materials in a bath, the apparatus comprising a reservoir containing a liquid as the bath, a flighted endless conveyor that serially present flights to a loading zone where each flight serially receives thereon materials to be immersed in the liquid of the bath and later presents materials initially received by the preceding flight to a discharge zone from whence the materials leave the flight, wherein the loading zone to discharge zone involves an initial flight supported lowering of the materials down to the bath and thereafter a following flight carriage of the materials and/or liquid in the bath until such time as the materials are supported by the following flight out of the liquid of the bath and carried at least in part thereby to the discharge zone at which the materials cascade from the following flight. It is considered that the materials cascading from a following flight at the discharge zone comprises a first special technical feature.

Cont'd

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/NZ2004/000074

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	**1 to 7, 10, 11, 13 to 15 and 18**	**YES**
	Claims	**8, 9, 12, 16 and 17**	**NO**
Inventive step (IS)	Claims	**1 to 7, 10, 11, 13 to 15 and 18**	**YES**
	Claims	**8, 9, 12, 16 and 17**	**NO**
Industrial applicability (IA)	Claims	**1 to 18**	**YES**
	Claims		**NO**

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1 US 1955749

D2 DE 3340509

D3 US 2001/0047814

Novelty (N) Claims 8, 9, 12, 16 and 17

Claims 8 and 9

The invention defined in Claim 8 is not considered to be novel in light of all three citations. For example, D1 discloses the use of flighted endless conveyor (Page 2, lines 8 to 13) for the purpose of immersing materials (fruit 20) in a bath (tank 6). Figure 1 of this citation also discloses the materials (20) are buoyant in the liquid (12) of the bath (6) and an underside of the flights (feeder board 38) lowers the materials (20) into the liquid (12) as defined in Claim 9. The invention as defined in Claims 8 and 9 are therefore not considered to be novel.

Claim 12

The bath periphery conforming at least in part to those regions of the conveyor that are to lower the materials into, to carry the materials through and uplift the materials from, liquid of the bath, as defined in Claim 12, is considered to be disclosed by Figure 1 of D1, Figure 2 of D2 and Figure 1 of D3, hence the invention is not novel.

Claims 16 and 17

The invention defined in Claim 16 is considered not to be novel in light of any of the above citations. For example, D3 discloses a method of treating vegetable and/or fruit materials (Paragraph 0002) which comprises or includes immersing the materials (13) in a treating liquid (wash bath 87) under the action of a flighted endless belt conveyor (17). The invention is therefore not considered to be novel. Figure 8 of D3 also discloses the underside of one flight (45) contacting during at least an initial part of the immersion process, at least some of the materials (13) which prior to immersion were lowered (139) on the upperside of the flight preceding the one flight as defined in Claim 17. The inventions defined in these claims are therefore not considered to be novel.

Inventive Step (IS) Claims 8, 9, 12, 16 and 17

Claims 8, 9, 12, 16 and 17

As above

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **IV Lack of Unity of Invention**

2. Claims 8, 9, 11, 12 and 15 are directed to the use of a flighted endless conveyor for the purpose of immersing materials in a bath. Claims 16 and 17 are directed to a method of treating vegetable and/or fruit materials which comprises or includes immersing the materials in a treating fluid under the action of a flighted endless belt conveyor. It is considered that the use of a flighted endless conveyor for the purpose of immersing materials in a bath comprises a second special technical feature.

Since the abovementioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

"MATERIAL IMMERSION APPARATUS"

TECHNICAL FIELD

The present invention relates to apparatus, methods, uses and products capable of providing a liquid dipping process for material or material(s) ("material(s)"). More particularly although not solely the invention utilises an inverted flighted endless conveyor to lower and uplift the material(s) and to hold the material(s), if buoyant with respect to the liquid, to force the material(s) under the liquid prior to uplifting the material(s) thereform.

BACKGROUND ART

Rotary paddled systems have hitherto been utilised in a bath, the wall of which assumes a form similar to that of the locus of the distal part of the paddles of the rotary wheel.

The present invention appreciates however that such paddle wheel systems provide a transitory immersion only where by necessity (where there is to be both a gravity assisted loading zone and a gravity assisted discharge zone from the paddle wheel) there is a keeping of the liquid level below the rotational axis.

The present invention recognises a significant advantage can arise from the use of a flighted endless conveyor in that it has the prospect of providing a longer dwell time in liquid without reliance on a greater volume of liquid over that which might be used in a paddled wheel immersion system. Moreover the present invention recognises an advantage can occur at the discharge zone from such a conveyor when inverted owing to the prospect that such an endless conveyor can provide a discharge zone which is more positive in allowing the falling of already immersed materials therefrom.

It is therefore an object of the present invention to provide apparatus, methods, uses, etc. which will at least go someway to take one or more advantage from the use of a flighted endless conveyor for the purpose of material immersion in a liquid.

As used herein the term "liquid" includes any fluid which has a liquid component, i.e. it can include mixtures of liquids, solutions, suspensions, emulsions, suspo-emulsions, etc.

PCT/NZ2004/000074
Received 19 January 2005

DISCLOSURE OF INVENTION

In one aspect the invention consists in **apparatus for immersing material or materials ("material(s)") in a bath,** [said material(s) being preferably buoyant with respect to liquid of the bath], said apparatus comprising or including

a bath or reservoir ("reservoir") containing or to contain said liquid,

a flighted endless conveyor that serially present flights to a loading zone where each flight serially flight receives thereon material(s) to be immersed in the liquid of the bath and later presents material(s) initially received by the preceding flight to a discharge zone from whence the material(s) leave the flight,

wherein the loading zone to discharge zone involves an initial flight supported lowering of the materials down to the bath and thereafter a following flight carriage of the material(s) and/or liquid in the bath until such time as the materials are supported by said following flight out of the liquid of the bath and carried at least in part thereby to the discharge zone at which the materials cascade from said following flight.

The reservoir can have provision for flow through or replenishment.

Preferably the discharge zone involves a gravity supported cascading of the materials from said following flight to a separate liquid to that of said bath.

Preferably each flight at least substantially completely occludes a passageway through the bath defined by the conveyor and the reservoir.

Preferably the locus of movement of the endless conveyor is that of an inverted conveyor preferably substantially in the form of an inverted "j", the loading zone being at a region beyond the crook of the inverted "j" down which the flights move substantially on a vertical locus prior to ascending on the opposite side of the stem of the "j" and then into the overhang zone of the inverted "j" at which there is the discharge zone.

Preferably in other forms banana or other type circuit type shapes are contemplated irrespective of whether or not there is a vertical or near vertical descending from the loading zone, irrespective of whether or not there is a vertical or near vertical ascending from the lower most zone and irrespective of whether or not there is any overhand (and irrespective of any concavity or not in the locus).

In yet a further aspect the present invention consists **in the use of a (or an inverted) flighted endless conveyor** for the purpose of immersing materials in a bath, e.g. of a dipping liquid.

Preferably the materials are buoyant in the liquid of the bath and an underside of flights of the conveyor lowers the material in the liquid at least after an initial contacting of the liquid by the materials, e.g. preferably they are lowered on the upper side of the flight preceding the underside of the following flight.

By way of example only such immersion can be of apple pieces, e.g. during a process as in PCT/NZ02/00168.

Preferably the bath conforms at least in part to those regions of the conveyor that are to low the materials to carry the materials through and uplift the materials from the liquid.

In yet a further aspect the present invention consists in **the use of apparatus** of any of the kinds in accordance with the present invention for the purpose of dipping vegetable and/or fruit material in an appropriate dipping solution.

In still a further aspect the present invention consists in **dipping apparatus** substantially as herein described with reference to any one or more of accompanying drawings.

In yet a further aspect the present invention consists in **a method of dipping materials** when performed substantially as herein described with reference to any one or more of the accompanying drawings or the description generally.

In yet a further aspect the present invention consists in **a method of treating vegetable and/or fruit materials** which comprises or includes immersing the materials in a treating liquid under the action of a flighted endless belt conveyor.

Preferably an underside of one flight contacts, during at least an initial part of the immersion process in a bath, at least some of the materials which prior to immersion were lowered on the upper side of the flight preceding said one flight.

The invention also consists in **materials** treated by a method or apparatus of the present invention.

BRIEF DESCRIPTION OF DRAWINGS

A preferred form of the present invention will now be described with reference to the accompanying drawing in which,

Figure 1 is a side view of an inverted (an inverted J shaped locus) and flighted endless belt conveyor having an infeed loading zone for materials (such as apple slices) and having a

discharge zone which under gravity drops the materials into a like or, as shown, a conventional paddle wheel type immersion apparatus for a secondary immersion process, and

Figure 2 is a perspective diagram shown with the bath containment transparent (for east of explanation) showing the inter-relationship of the components.

BEST MODE FOR CARRYING OUT THE INVENTION

In the preferred form of the present invention a bath 1 defined by liquid in the lower part, the reservoir, of a generally inverted "j" or banana shaped containment (both inner and outer walls) has descending there into a series of flights 3A, 3B, etc. carried by a motor/gearbox driven endless belt conveyor such that apple slices, onion slices or other materials may be fed into the encompassment of the bath 1 but above the liquid level shown as 5 so as to be supported on a flight 3A (on one side) prior to that moving downwardly below the liquid thereby floating the apple pieces on the liquid until such time as the following flight 3B (by its side facing flight 3A) forces the materials downwardly around the bottom 4 of the bath before uplifting the materials with the flight 3B to the discharge zone 6 from whence the immersed materials cascade into any subsequent collection or subsequent treatment apparatus.

The flights (e.g. 3A, 3B et al.) are preferably perforated slats (or a mesh or mesh including) to ensure the immersed product can freely drain back to the bath prior to discharge.

The belt itself need not be perforated but can be (e.g. a mesh).

As shown, by example, is a paddle wheel arrangement 7 for a subsequent treatment solution.

A process that might be utilised is an apple or other treatment regime substantially as disclosed in the aforementioned Patent Specification of HortResearch or which may be a treatment regime such as disclosed by various Mantrose Haueser Company patent (e.g. US 5,925,395 and 5,939,117).

As shown in the drawings an infeed conveyor 8 is provided to feed to the loading zone 9 between flights whilst the liquid level of the liquid 5 in the inverted 'j' shaped bath (both that shape for the inner and the outer walls so as to provide a better guide for the belt) is maintained reliant upon a dosage tank 10 feeding through a heat exchanger 11 communicating by a pump system 12 with the bath 1. As separate liquid can be provided in any subsequent treatment apparatus such as the paddle arrangement shown in 7.

Persons skilled in the art will appreciate the speed control applicable (dependent on treatment needs) for the motor/gearbox 13 (e.g. providing variable speed drive to allow different immersion times) and for relativity with any previous and following processing the variations that exist for arrangements as aforesaid.

Materials by which the conveyor system and surrounds can be made are of any suitable material that can handle the stress of the environment and usage as well as provides such acceptability as is required for what are preferably food grade items. Envisaged therefore as suitable materials are food grade plastics materials (e.g. PVC, RMV, NITRILE, HDPE, etc.), food grade rubber or synthetic rubber materials, food grade or other metals (e.g. stainless steel) as well as for non-food and/or bath contacting surfaces any suitable acceptable structural or manufacturing material (e.g. mild steel, plastic, etc.).

The control systems and drives are of any acceptable kind and will be well known to persons skilled in the conveying art and/or food processing industries.

PCT/NZ2004/000074
Received 19 January 2005

CLAIMS:

1. **Apparatus for immersing material or materials ("material(s)") in a bath,** said material(s), said apparatus comprising or including

a reservoir containing or to contain a liquid as said bath,

a flighted endless conveyor that serially present flights to a loading zone where each flight serially flight receives thereon material(s) to be immersed in the liquid of the bath and later presents material(s) initially received by the preceding flight to a discharge zone from whence the material(s) leave the flight,

wherein the loading zone to discharge zone involves an initial flight supported lowering of the materials down to the bath and thereafter a following flight carriage of the material(s) and/or liquid in the bath until such time as the materials are supported by said following flight out of the liquid of the bath and carried at least in part thereby to the discharge zone at which the materials cascade from said following flight.

2. Apparatus of claim 1 wherein said liquid is one in which said material(s) is(are) buoyant.

3. Apparatus of claim 1 or 2 wherein the discharge zone involves a gravity supported cascading of the materials from said following flight to a separate liquid to that of said bath.

4. Apparatus of any one of the preceding claims wherein each flight at least substantially completely occludes a passageway through the bath defined by the conveyor and the reservoir.

5. Apparatus of any one of the preceding claims wherein the locus of movement of the endless conveyor is that of an inverted conveyor preferably substantially in the form of an inverted "j", the loading zone being at a region beyond the crook of the inverted "j" down which the flights move substantially on a vertical locus prior to ascending on the opposite side of the stem of the "j" and then into the overhang zone of the inverted "j" at which there is the discharge zone.

6. Apparatus of any one of claims 1 to 4 wherein the locus of movement of the endless conveyor is such that there is in use a vertical or near vertical descending from the loading zone, irrespective of whether or not there is a vertical or near vertical ascending from the lower most zone and irrespective of whether or not there is any overhand (and irrespective of any concavity or not in the locus).

7. Apparatus of any one of the preceding claims substantially as hereinbefore described with reference to one or both of the accompanying drawings.

8. **The use of a flighted endless conveyor** for the purpose of immersing materials in a bath.

9. The use of claim 8 wherein the materials are buoyant in the liquid of the bath and an underside of flights of the conveyor lowers the materials in the liquid.

10. The use of claim 8 or 9 using apparatus of any one of the claims 1 to 6.

11. The use of any one of claims 8 to 10 wherein the immersion is of apple pieces during a process as disclosed in PCT/NZ02/00168.

12. The use of any one of claims 8 to 11 wherein the bath periphery conforms at least in part to those regions of the conveyor that are to lower the materials into, to carry the materials through, and uplift the materials from, the liquid of the bath.

13. **The use of apparatus** of any one of claims 1 to 7 for the purpose of dipping vegetable and/or fruit material in an appropriate dipping solution.

14. **Dipping apparatus** substantially as herein described with reference to either one or both of accompanying drawings.

15. **A method of dipping materials** when performed substantially as herein described with reference to either one or both of the accompanying drawings or the description generally.

16. **A method of treating vegetable and/or fruit materials** which comprises or includes immersing the materials in a treating liquid under the action of a flighted endless belt conveyor.

17. A method of claim 16 wherein an underside of one flight contacts, during at least an initial part of the immersion process in a bath, at least some of the materials which prior to immersion were lowered on the upperside of the flight preceding said one flight.

18. **Materials** treated by a method of any one of claims 15 to 17, apparatus of any one of claims 1 to 7 or a use of any one of claims 8 to 13.

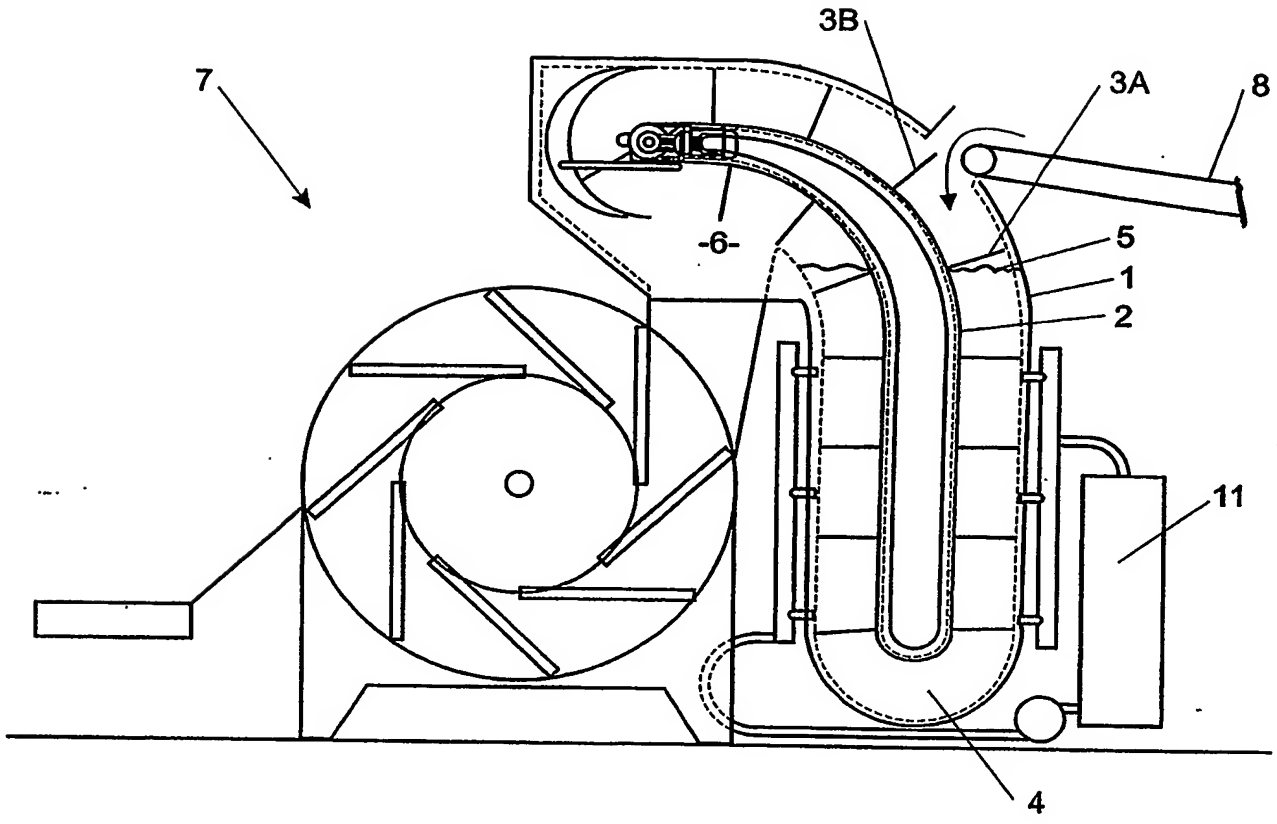

FIGURE 1

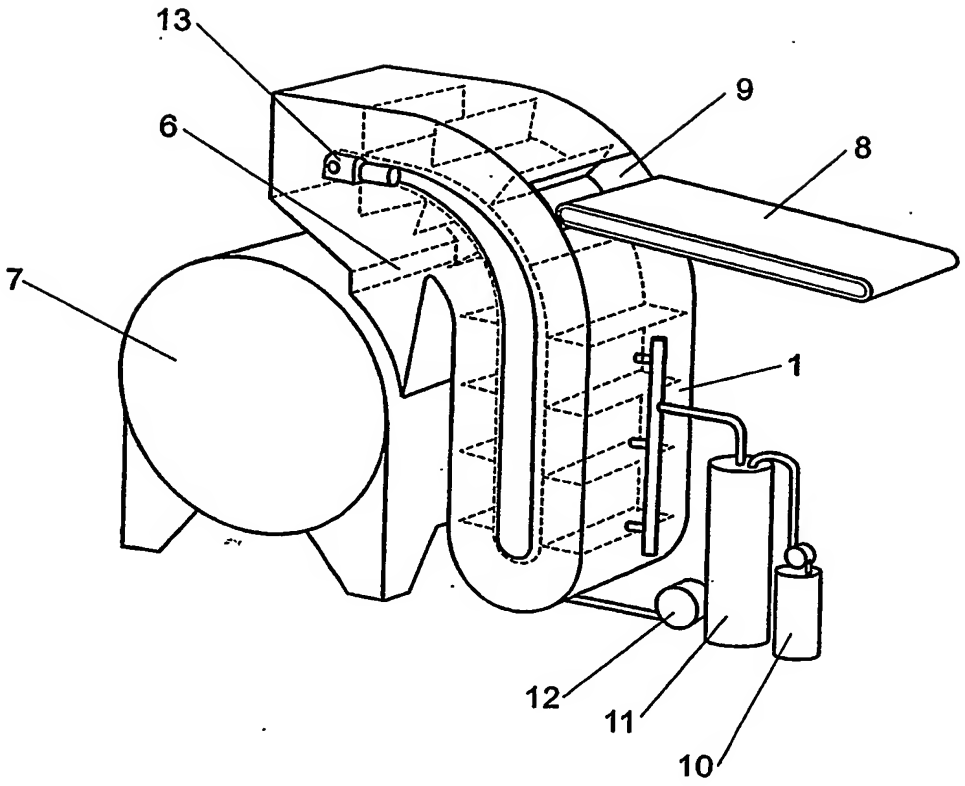

FIGURE 2